KEY ENVIRONMENTAL INCORPORATED

March 28, 2011

**VIA FEDERAL EXPRESS**

Mr. Christopher J. Kanakis
Mr. Joseph Karpa
New Jersey Department of Environmental Protection
P.O. Box 028
401 East State Street, 6th Floor
Trenton, New Jersey 08625-0028

**Re: Slurry Wall Installation Update**
**Interim Response Action Project**
**Diamond and Standard Chlorine Chemical Company Inc. Sites**
**Kearny, Hudson County, New Jersey**

Dear Mr. Kanakis and Mr. Karpa:

On behalf of the Peninsula Restoration Group (PRG), Key Environmental, Inc. (KEY) has prepared this letter related to the slurry wall installation, as described in the Final Interim Response Action Workplan (IRAW), dated October 2008. Installation of the slurry wall was initiated on March 16, 2011 by Inquip Associates, Inc. (Inquip), under subcontract to WRScompass, Inc. (WRS); Inquip is the contractor that installed the slurry wall on the adjacent Seaboard Site. KEY has been providing Construction Quality Assurance (CQA) inspection services, to document conformance of the installation to the Contract Documents. These Contract Documents include, in addition to other indirect testing requirements, the requirement for the installation to achieve the following in-place criteria, as required by the IRAW:

- Hydraulic conductivity $\leq 1x10^{-7}$ cm/sec; and,
- Unconfined Compressive Strength (UCS) $\geq 25$ pounds per square inch (psi).

In addition, KEY established routine performance monitoring guidelines, to demonstrate the general consistency of the slurry mix. These criteria include commonly monitored parameters such as viscosity, density, and pH. KEY has been generally satisfied with the slurry wall installation; however achievement of the in-trench viscosity criteria of not greater than 50 seconds (Marsh Funnel measurement) has been particularly problematic. Although we do not necessarily expect this non-conformance to have any effect on the IRAW-specified criteria (i.e., permeability and UCS) we nonetheless have asked WRS to address this non-conformance. Our resultant proposed path forward is discussed below.

Inquip has provided a recommendation for the addition of Marasperse C-21 to the cement-bentonite mix (please see attached correspondence). This material is a commonly used additive that reduces mix viscosity and improves workability. Although this product was not included in the laboratory Mix Design Studies conducted by KEY or WRS, Inquip has indicated in their correspondence that the additive will not adversely affect permeability or UCS. Based upon KEY's research we agree with their recommendation and, subject to the conformance of the

installation with the technical specifications, we are prepared to approve the addition of Maraspese C-21 to the slurry, as proposed by Inquip. Perhaps most importantly, WRS/Inquip have agreed that they are fully responsible to replace any portions of the slurry wall installation that do not meet the IRAW-specified criteria for permeability and UCS. Sample collection has been conducted since the initiation of slurry wall construction, and KEY will be monitoring the test results for conformance to the Technical Specifications, as such results become available.

As explained above, slurry wall installation is ongoing however the in-trench viscosity guideline has not been achieved for this section of the wall. KEY proposes to tentatively accept this wall section (installed prior to the addition of Marasperse C-21) as well, based upon WRS'/Inquip's agreement that they are fully responsible to replace any of these portions that do not meet the IRAW-specified criteria for permeability and UCS.

Please contact us following review of this correspondence to advise us of any concerns you may have with our proposed approach to adjustment of the slurry wall technical specifications. Please feel free to contact Mr. Alan Briggs or me at (412) 279-3363 at your earliest convenience.

Sincerely,

**Key Environmental, Inc.**

James Zubrow

James S. Zubrow, P.G.
Principal Hydrogeologist

cc: F. Faranca
M. W. Kelly
E. Castro
M. Brourman
M. Slenska
G. Coscia
A. Hess
K. Staiger
M. Martello

**INQUIP ASSOCIATES, INC.**

SLURRY WALLS
SEEPAGE BARRIERS
FLEXIBLE LINERS
GROUTING

GEOTECHNICAL CONTRACTOR

je.daw/01113

McLean Office
March 22, 2011

WRSCompass
221 Hobbs St, Suite 108
Tampa, FL 33619

Attn: Mr. Todd King

**RE:** SCCC/Diamond

Dear Mr. King,

Reference is made to the email received from Key Environmental on March 18, 2011, concerning in-trench viscosity of the slag cement bentonite slurry. We have trenched two additional days and while the in trench viscosity has been less than that measured on March 18, it is still above the 50 second Marsh Funnel viscosity required per the specifications. In trench viscosity, while important for workability of the slurry (the excavator arm needs to move freely and the depth measuring device needs to be able to reach the trench bottom), is not related to the unconfined compressive strength or the hydraulic conductivity.

In order to meet the in trench viscosity requirement, we believe we will need to add a small amount (1 pound or less per cy of cement bentonite mix) of Marasperse C-21 manufactured by Lignotech (see attached typical data sheet and material safety data sheets). Marasperse C-21 is a dispersant. When added to cement bentonite slurries, it reduces the viscosity and retards the initial set by several hours. It does not effect the 28-day unconfined compressive strength nor the hydraulic conductivity. Inquip has been using Marasperse C-21 in all of our cement bentonite slurry walls since 1987, totaling nearly 1.5 million square feet of CB wall. We also believe the use of Marasperse C-21 will improve the mixability of the CB mix in the mixer, resulting in a more well mixed grout.

If the use of Marasperse C-21 cannot be approved, we would request an increase in the allowable in trench viscosity to 65 seconds Marsh Funnel. In either case, Inquip will still be responsible to provide an insitu unconfined compressive strength greater than 25 psi and a maximum hydraulic conductivity of 1E-7 cm/sec in the completed cutoff wall.

I thank you in advance for your consideration and timely response to this request. If we can provide additional information please let me know.

Best regards,

James C. Edwards
VP Operations

WESTERN REGION P.O. BOX 2182 • Santa Barbara, CA 93120 • (805) 687-2007 • FAX (805) 682-0396
EASTERN REGION P.O. Box 6277 • McLean, VA 22106 • (703) 442-0143 • FAX (703) 442-0188

CORPORATE WEBSITE: www.inquip.com

Borregaard LignoTech

**Borregaard Deutschland GmbH**
LignoTech Werk Karlsruhe
DEA- Scholven- Strasse 9
D-76187 Karlsruhe, Germany

Tel.: +49 721 55991-0
Fax.: +49 721 55991-10

Publ. No. LTD 2125
Edition September 9, 2008
Marasperse C-21

# Marasperse C-21

## Product description

Marasperse C-21 is a spray dried calcium/sodium lignosulphonate.
Typical Application: Dispersant/ stabilizing agent in gypsum stucco, agricultural chemicals, industrial cleaners, oil in water emulsions, wax emulsions, clay deflocculation, foundries, inorganic slurries.
CAS No. 8061-52-7, 8061-51-6

## Specification

| | | Test Method |
|---|---|---|
| Dry matter [%] | min 91,0 | A01 |
| pH (10 % solution) | 7,5 +/- 0,5 | A04 |
| | | A46 |

## Typical Analysis*

| Chemical Data | | Physical Data | |
|---|---|---|---|
| Calcium, Ca [%] | 4,6 | Bulk density [kg/m3] | 550 |
| Sodium, Na [%] | 2,9 | | |
| Sulfonate sulphur [%] | 5,7 | | |
| Total sulphur [%] | 6 | | |
| HPLC sugars [%] | 3,8 | | |

*The above analyses are not formal specifications and values may change.
Chemical Data calculated on solids.

## Storage Stability:

Marasperse C-21 remains stable for several years if stored under dry conditions.

## Compatibility:

Lignosulphonates are compatible with anionic and non- ionic materials, dispersants, wetting agents and most organic and inorganic materials.

## Packaging:

25 kg polyethylene or kraft multiwall bags.

## Lead Time:

Two weeks lead time is typical.

**Safety Data Sheets** are available upon request.

**Please contact your LignoTech Sales Representative for additional product information.**

LIGNOTECH USA, INC.
Research & Development
100 Grand Avenue
Rothschild, WI
54474-1198
TEL: (715)359-6544
FAX: (715)355-3648

EMERGENCY PHONE (715)359-6544
*CHEMTREC PHONE (800)424-9300

MSDS NO.: 101056
ORDER NO.:
PREPARED ON: 01/13/2010
REPLACES: All Previous

PREPARED BY: S. Lebo

***Use only in the event of chemical emergencies involving a spill, leak, fire, exposure, or accident involving chemicals .**

## I. PRODUCT IDENTIFICATION

| | | | |
|---|---|---|---|
| Common Name: | Calcium Lignosulfonate | Chemical Formula: | Amorphous Polymer |
| Synonyms: | See Above | Chemical Family: | Wood Chemicals |
| Manufacturer: | LignoTech USA, Inc. | CAS Numbers: | 8061-52-7 + 8061-51-6 |
| Shipping Name - DOT: | Lignin Pitch - Class 55 | | |
| Hazard Class - DOT: | Not Restricted | UN Number: | Excluded |
| Hazard Class - IATA: | Not Restricted | Physical State: | Powder |

HMIS Rating(0-4) HEALTH = 1 FIRE = 1 REACTIVITY = 0 SPECIAL = 0

WARNING NUISANCE DUST -- As with all dusts, avoid high concentrations.

## II. HAZARDOUS INGREDIENTS

| Principal Hazardous Components | Percent | Threshold Limit Value (units) |
|---|---|---|
| None known | | |

## III. PHYSICAL DATA

| | | | |
|---|---|---|---|
| Boiling Point (C): | Not Applicable | Specific Gravity (25 C): | Not Applicable |
| Freezing Point (C): | Not Applicable | pH (3% Soln.): | 8 - 9 |
| Vapor Pressure (mm Hg): | Not Applicable | Bulk Density (g/ml): | 0.37 - 0.56 |
| Vapor Density (Air = 1): | Not Applicable | Solubility in Water: | 100% Soluble |
| % Volatiles By Weight: | 3 - 9 (water) | Evaporation Rate: | Not Applicable |
| Appearance & Odor: | Brown powder with slight odor. | Water/Oil Dist. Coeff.: | 100% in water |

## IV. HEALTH HAZARD DATA

| | |
|---|---|
| Threshold Limit Values: | OSHA PELV = 15 mg/M3 for dust<br>Minimize contact with eyes, skin, clothing. |
| Carcinogen Listings - NTP / IARC: | Not a carcinogen |
| Primary Route(s) of Entry: | Skin contact, eye contact, inhalation |
| Symptoms of Overexposure: | No effects of overexposure to lignosulfonates are known. |
| Conditions Aggravated by Exposure: | None known. |
| Irritancy of Material: | None known. |
| Sensitization to Material: | May cause allergic reaction in rare cases. |
| Teratogenicity: | None known. |
| Mutagenicity: | None known. |
| Reproductive Toxicity : | None known. |
| Synergistic Substances: | None known. |
| First Aid -- Eyes: | Irrigate with potable water. |
| Skin: | Skin should be flushed with clean water. |
| Inhalation: | Remove from dusty area. |
| Ingestion: | Give water to dilute and get medical attention. |
| Notes to Physician: | Very low toxicity. LD50 > 2 g/kg (rat, oral) for similar product. |

## V. FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used): Auto Ignition Temp: 400 C for dust

| | | | |
|---|---|---|---|
| Flammable Limits in Air, % By Volume | Not Applicable<br>Lower: 0.2 oz./cu.ft. | Upper: | 3.5 oz./cu.ft. |

Extinguishing Media: *Use water spray, carbon dioxide, dry chemical, alcohol-type or universal-type* foams applied by manufacturers recommended techniques.

Special Fire Fighting Procedures: Use supplied breathing air and protective clothing.

Unusual Fire and Explosion Hazards: Flammable solids may provide conditions for a dust explosion.

## VI. SPILL OR LEAK PROCEDURES

Spill Response: Mechanically collect and remove spilled material. Area may be washed with water.

Neutralizing Chemicals: None required.

Waste Disposal Methods: Incinerate, bury or flush to sewer following applicable regulations.

## VII. REACTIVITY DATA

| | | | |
|---|---|---|---|
| Stability: | Stable | Conditions to Avoid: | Contact with strong oxidizing agents. |
| Incompatibility: | | Materials to Avoid: | None |
| Hazardous Polymerization: | Will not occur | Conditions to Avoid: | None |

Hazardous Decomposition Products: Sulfur dioxide, carbon dioxide, and carbon monoxide.

## VIII. CONTROL MEASURES

| | |
|---|---|
| Ventilation Requirements: | Adequate ventilation for comfort is recommended. |
| Respiratory Protection: | Full respiratory protection program recommended.<br>NIOSH approved dust mask recommended. |
| Protective Gloves: | Gloves recommended for prolonged exposure. |
| Eye Protection: | Goggles recommended for prolonged exposure. |
| Other Protective Equipment: | Clothing which contacts skin should be changed daily. |

## IX. SPECIAL PRECAUTIONS

| | |
|---|---|
| Repair/Maintenance of Contaminated Equipment: | None required. |
| Hygiene in Handling and Storage: | Personal hygiene is strongly encouraged so all clothing items are changed daily. |
| Other: | Normal precautions common to good manufacturing practice should be followed. |

## X. ADDITIONAL REGULATORY CONCERNS

Lignosulfonates are non-toxic & non-irritating. Government regulations for use of lignosulfonates are summarized below:

Agriculture Canada Animal Feeds. File No. 832.2B2.
40 CFR 180.1001 Sections (c) & (e)
21 CFR 176.120; 176.170; 176.180; 178.3120 - Paper
21 CFR 173.310 - Boiler Water
21 CFR 172.715; 182.99 - Pesticides for Food
21 CFR 176.210 - Defoamers
21 CFR 177.1210 - Gaskets
21 CFR 175.105 - Adhesives
21 CFR 573.600 - Animal Feeds